IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent Application No.: 10/626,413	Group Art Unit: 2812
Filing Date: July 24, 2003	Examiner: Ghyka, Alexander G.
For: Ferroelectric And High Dielectric Constant Integrated Circuit Capacitors With Three-Dimensional Orientation For High-Density Memories, And Method Of Making The Same	Docket No.: 13176.431C!US
	Confirmation No.: 9869
Applicants: Paz de Araujo et al.	

DECLARATION OF LARRY D. McMILLAN

I, Larry D. McMillan, hereby declare:

1. I am President and CEO of Symetrix Corporation at 5055 Mark Dabling Boulevard, Colorado Springs, Colorado, where I am involved in directing various research and business activities, which include integrated circuit manufacturing process development. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true.

2. I have worked for over 40 years as an integrated circuit process engineer. I have published more than one hundred papers and presentations on the subject of integrated circuit process engineering and have more than 75 issued US patents in the field. A copy of my curriculum vitae with a partial list of my papers and patents is attached hereto as Exhibit A.

3. I am an inventor in the above-identified patent application (hereinafter "the application") and Symetrix Corporation (Symetrix) is the assignee of the application.

4. I submit this Declaration to present to the Examiner, in an authenticated manner, facts concerning the relevance of the reference cited in the Office Action dated September 30, 2005 (hereinafter "the Office Action") and the patentability of the claims.

5. I have read the present claims of the application, the Office Action, and the reference cited by the Examiner, i.e., U.S. Patent No. 6,506,643, issued January 14, 2003, to Hsu et al. (hereinafter "Hsu et al.").

6. The Office Action states that the claimed thicknesses of an 80 nm ferroelectric and a 200 nm capacitor laminate would be within the level of skill of one of ordinary skill in the art, for the benefit of storing more memory in less space. The portion of this statement that says that these thicknesses would be within the level of skill of one of ordinary skill in the art is incorrect.

7. Until the teachings of the present application, it was not possible for anyone, much less one of ordinary skill in the art, to make a three-dimensional capacitor with a ferroelectric film thickness not exceeding 80 nm and a capacitor laminate thickness not exceeding 200 nm as claimed in claim 1. As the Examiner has suggested, if this could have been done, Hsu et al. would have mentioned it, since it would make a more dense memory.

8. It has taken the inventors more than ten years to be able to make three-dimensional capacitors with film and capacitor laminate thicknesses this small.

9. A key aspect of being able to make capacitors with such small thicknesses was the low thermal budget deposition process, which is described in the present patent application. As described in the application, using this deposition method prevents damage that would lead to shorting of the extremely thin films.

10. The low thermal budget process was a true breakthrough, since prior to the invention of this process, those skilled in the art thought that better thin films could be made only by lowering the temperature.

11. However, as described on pages 16 and 17 of the present application, the low thermal budget process actually uses higher temperatures than prior art processes, but for a much shorter time.

12. The reduced heating time at elevated temperature of a low-thermal-budget technique in accordance with the invention reduces the formation of hillocks and other non-uniformities at the surfaces of deposited layers. The resulting enhanced smoothness improves interfacial contacts and inhibits electrical shorting. See page 37, lines13 – 25, of the application.

13. The low thermal budget also provides less heat to drive the oxygen used in the capacitor fabrication process to the transistor, thus preventing corruption of the transistor due to oxide production.

14. Another aspect of the invention that is helpful, but not necessary, in obtaining the thicknesses is the placing of the capacitor on a plug that gets it away from the transistor, which prevents the higher temperatures of the low thermal budget process from affecting the transistor and the back end reduction processes of the transistor from affecting the relatively delicate thin capacitor elements.

15. Another aspect of the invention that is helpful, but not necessary, is the use of only RTP, in contrast to the prior art furnace annealing, which allows the temperature to be ramped up and down quickly before it can deteriorate the electrodes and the transistor.

16. There are many other minor aspects described in the application that go together to allow us to have been the first to make workable 3-D capacitors so small.

17. Now that we have described how to make 3-D capacitors with such small dimensions, those skilled in the art will now know how to modify our processes to make small capacitors. For example, prior art heating processes could be used if the interlayer dielectric between the transistor and capacitor were made thicker so as to protect the transistor; or other designs could be used which, instead of using a thick interlayer dielectric, employed barrier layers that stopped oxygen and reduction gases from moving between the capacitor and transistor.

18. All of the above matters apply especially to 3-D capacitors, as opposed to 2-D capacitors because the thin layers spread over such large areas provide much more opportunity for a short or other problem to develop.

19. Since the inventors have shown for the first time how to make 3-D capacitors with extremely thin ferroelectric films and thin capacitor laminates, one skilled in the art may modify the processes and structures mentioned above to produce such capacitors without using one or more of the process and structural elements described in the application, but using the general principals taught in the application.

20. Since these general principals were not obvious at the time of the invention, for the reasons given above, therefore, it is fair and equitable to grant applicants a patent on the current claims which describe a unique structure never before accomplished.

21. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

12-29-05
Date

Larry D. McMillan

Larry D. McMillan

CURRICULUM VITAE

EDUCATION

Ph.D. (Candidate)	University of Colorado at Colorado Springs
M.S.E.E.	Arizona State University, 1972
B.S.	Aquinas College, 1965 (physics and mathematics)
	Michigan Technological University, 1986-1993 Adjunct Professor

EXPERIENCE

1988-Present

Symetrix Corporation
President and CEO

Corporate Management. Ferroelectric and other proprietary materials research and development, process and device development, program management and planning.

1984-1988

Ramtron Corporation
Vice President (R&D) and Corporate Founder

Member, Ramtron Board of Directors. Research and development of ferroelectric memory devices and integrated circuits. Primary investigations of phase three potassium nitrate and other ferroelectric materials.

1982-1984

Honeywell, Inc.
MOS Operations Manager

All MOS operations including wafer fabrication, maintenance,. device engineering, process engineering, product engineering, test engineering, CAP/CAM, production testing and new process development. Member of Key Management Group (Corporate Level).

Manager, MOS Advanced Development

CAP/CAM development, CMOS process development, CCD TCL sensor process development, process transfers and long range planning activities. Developed and taught Operator and Technician Level IC Processing course (Honeywell Certificate Program)..

MOS Process Engineering Manager

MOS production process engineering, maintenance, CCD process transfer from R&D to production, 3" to 4" wafer conversion, and advanced silicon gate MOS process development.

1980-1982	Stephenson Westem, Inc. Vice President Engineering Consultant to the semiconductor industry. Computer modeling, fab design, UPDI water system design, process equipment selection, EPA regulations and hazardous chemical disposal. (Customer base included: Motorola, General Electric, Monolithic Memories, Fairchild, Signetics, Storage Technology, Intel and Mitel. (The firm was purchased by The Thomas Group.)
1979-1980	Storage Technology Corporation Vice President and General Manager of Microtechnology Operations Organized, staffed, designed and facilitized startup of semiconductor and thin film head and thin film media R&D and production facility.
1977-1979	National Cash Register (NCR) Corporation Director of Engineering All research, development and program management activities at the Colorado Springs NCR Integrated Circuit facility.
1976-1977	American Microsystems, Inc. Manager, CMOS Process Engineering All aspects of silicon gate CMOS process engineering, including process control and process development. VMOS and UMOS process development and transfer of NMOS process to Pocatello, Idaho facility. Developed and taught Operator and Technician Level Mathematics course.
1966-1976	Motorola, Inc. Manager, Device Engineering (1975-1976) Silicon gate NMOS fab device engineering and production process control. Established LPCVD silicon nitride and poly silicon as production processes in Austin, Texas facility. Staff Scientist, Advanced Product R & D Labs (1973-1975) Process development of 4K and 16K NMOS RAMS. Multi-level metal MOS development, spin-on metallic oxide development, and LPCVD poly silicon and silicon nitride development.

Larry D. McMillan

CURRICULUM VITAE

Manager, Linear IC Wafer Engineering (1973-1970)

Expanded Mesa, Arizona linear IC manufacturing capability from 2,000-2" wafers to 14,000-3" wafers per week. Linear device engineering, specification control, process control, wafer process engineering, linear process development, HIREL pilot line and wafer test. Developed and taught Engineering Level Process Engineering Classes (Motorola Certificate Program).

Engineering Manager, Product Engineering Liaison (1969-1970)

Safeguard Missile Program (secret). Beam lead processing.

Engineer, Motorola Advanced Pilot Line (1967-1969)

Photoresist, metalization, product development.

Engineer, Motorola Training Program (1966-1967)

MOS process development, C-V analysis, multi-layer metal, Epi, materials research, packaging.

Publications and Presentations

C.A. Paz de Araujo, ***L. D. McMillan***, Z. Chen, Y. Shimada, Y. Kato, T. Otsuki, "Ferroelectric Linked Cell Device Physics", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

Z. Chen, M. Lim, V. Joshi, Carlos A. Paz de Araujo, ***L. D. McMillan***, "Advanced Simulation Tool For FeRam Design", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

M. Lim, Z. Chen, V. Joshi, ***L. D. McMillan***, C.A. Paz de Araujo, "Random Accessibility of Ferroelectric FET As A Nonvolatile Non-Destructive Read Out (NDRO) Memory", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

J. Celinska, V. Joshi, N. Solayappan, M. Lim, ***L. D. McMillan***, C. Paz de Araujo, "Low Crystallization Temperature Regime of Strontium Bismuth Tantalate Ultra-Thin Films for High Density FeRAM Applications", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

Y. Shimada, U. Kato, T. Yamada, T. Otsuki, Z. Chen, M. Lim, V. Joshi, ***L. D. McMillan***, C. Paz de Araujo, "High Density and Long Retention Non-Destructive Readout FeRAMs using a Linked Cell Architecture", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

Z. Chen, N. Solayappan, V. Joshi, K. Laetz, C.A. Paz de Araujo ***L. D. McMillan***, "1K FeRam-Based Smart Card Application For Handspring Visor", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

J. Karasawa, Y. Hamada, K. Ohashi, E. Natori, K. Oguchi, T. Shimoda, V. Joshi, ***L. D. McMillan***, C. Paz de Araujo, "Effect of Process Condition on Microstructure of Thin SBT-Based Films", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

S. Narayan, V. Joshi, J. Celinska, M. Lim, ***L. D. McMillan***, C.A. Paz de Araujo, "Strontium Bismuth Tantalate Thin Films on IrO_x Bottom Electrodes For High Density FeRam Applications", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

L. D. McMillan, C.A. Paz de Araujo, S. Narayan, V. Joshi, "The Limits of Thickness Scaling in PZT and SBT and Its Effect on Reliability", abstract presented at *The Proceedings of the 13th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, March 2001.

J. Celinska, V. Joshi, S. Narayan, ***L. D. McMillan*** and C.A. Paz de Araujo, "Low Temperature Process for Strontium Bismuth Tantalate Thin Films", abstract presented at The Proceedings of the *12th International Symposium on Integrated Ferroelectrics*, Aachen, Germany, March 2000.

V. Joshi, N. Solyappan, J. Celinska, L.D. McMillan, C.A. Araujo, "A 650° C Process For Strontium Bismuth Tantalate thin films", abstract presented at The Proceedings of the 12th *International Symposium on Integrated Ferroelectrics*, Aachen, Germany, March 2000.

N. Solyappan, C. A. Paz de Araujo and ***L. D. McMillan***, "Status of Advanced LSMCD for Y-1 Deposition," invited paper published in *Science Forum, Inc.*, Tokyo, 1999.

C. A. Paz de Araujo, N. Solyappan, ***L. D. McMillan***, T. Otsuki and K. Arita, "Process Integration of Embedded FeRAMs", invited paper published in *Jour. ElectroCeramics, Special Issue*, 1999.

S. Narayan, V. Joshi, ***L. D. McMillan*** and C. Paz De Araujo, "Sub-l00 nm SBT Films for Low Voltage and High Density FeRam Applications", *Proceedings of the 11th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, Vol. 25, pp.509-517, March 1999.

M. Lim, J.W. Bacon, ***L. D. McMillan*** and C.A. Paz De Araujo, "SBT-Based Ferroelectric FET for Nonvolatile Non-Destructive Read Out (NDRO) Memory Applications", *Proceedings of the 11th International Symposium on Integrated Ferroelectrics*, Colorado Springs, CO, Vol. 27, pp. 1115-1124, March 1999.

N. Solayappan, V. Joshi, A. DeVilbiss, J. Bacon, J. Cuchiaro, ***L. D. McMillan*** and C. A. Paz de Araujo, "Chemical Solution Deposition (CSD) and Characterization of Ferroelectric and Dielectric Thin Films", *Integrated Ferroelectrics*, Vol. 22, pp. 521-531, 1998

C. A. Paz de Araujo, T. Otsuki, J. Cuchiaro and ***L. D. McMillan***, "Microcontrollers with Ferroelectric Embedded Memory", presented at *IEEE 1998 International Nonvolatile Memory Technology Conference*, June 22-24, Albuquerque, NM, 1998.

E. Fujii, T. Otsuki, Y. Judai, Y. Shimada, M. Azuma, Y. Uemoto, Y. Nagano, T. Nasu, Y. Izutsu, A. Matsuda, K. Nakao, K. Tanaka, K. Hirano, T. Ito, T. Mikawa, T. Kutsunai, ***L. D. McMillan*** and C. A. Paz de Araujo, "Highly Reliable Ferroelectric Memory Technology with Bismuth-Layer Structured Thin Films (Y-1 Family)", *IEDM, IEEE*, July 1997, pp. 597-600.

J.D. Cuchiaro, V. Joshi, C.A. Paz de Araujo, and ***L. D. McMillan***, "On the Voltage Linearity and Scalability of Thin Film High Capacitance Density Using [$X(Ba_{n1}Sr_{n2}(Nb,Ta)_{10}O_{30} + (1-x)SrTiO_3$] Solid Solutions," presented at *The 9th International Symposium on Integrated Ferroelectrics*, Santa Fe, NM, March 1997, to be published in 1998.

N. Solayappan, ***L. D. McMillan***, C.A. Paz de Araujo and B. Grant, "Second Generation Liquid Source Misted Chemical Deposition (LSMCD) Technology for Ferroelectric Thin Films," *The 9th International Symposium on Integrated Ferroelectrics*", Santa Fe, NM, Vol. 18, pp 626-636, March 1997.

H. Uchida, N. Soyama, K. Kageyama, K. Ogi, M.C. Scott, J. D. Cuchiaro, ***L. D. McMillan***, and C.A. Paz de Araujo, "Characterization of Self-Patterned SBT/SBNT Thin Films from Photo-Sensitive Solutions," *Proceedings of the 9th International Symposium on Integrated Ferroelectrics*", Santa Fe, NM, Vol. 18, pp. 749-761, March 1997.

J.D. Cuchiaro, N. Solayappan, C.A. Paz de Araujo, and ***L. D. McMillan***, "Optimization of Low Imprint Characteristics of Layered Perovskites," *Proceedings of the Ninth International Symposium on Integrated Ferroelectrics,* Santa Fe, NM, March 1997, to be published in 1998.

N. Solayappan, G.F. Derbenwick, ***L. D. McMillan***, C.A. Paz de Araujo, and S. Hayashi, "Conformal LSMCD Deposition of $SrBi_2(Ta_{1-x}Nb_x)_2O_9$," *Proceedings of the Eighth International Symposium on Integrated Ferroelectrics*, Tempe, AZ, Part I, Vol. 14, pp. 237-246, 1997.

H. Uchida, N. Soyama, K. Kageyama, K. Ogi, M.C. Scott, J.D. Cuchiaro, G.F. Derbenwick, ***L. D. McMillan***, and C.A. Paz de Araujo, "Characteristics of Self-Patterned $SrBi_2Ta_2O_9$ Thin Films

from Photo-Sensitive Solutions, *Proceedings of the Eighth International Symposium on Integrated Ferroelectrics*, Tempe, AZ, Part III, Vol. 16, pp. 41-52, 1997.

E. Fujii, T. Otsuki, Y. Shimada, M. Azuma, Y. Uemoto, Y. Oishi, S. Hayashi, T. Sumi, Y. Judai, N. Moriwaki, J. Nakane, C.A. Paz de Araujo, G.F. Derbenwick, and ***L. D. McMillan***, "Integration Technology of Ferroelectric Thin Films and Its Application to Si Devices," abstract presented at *The Proceedings of the Eighth International Symposium on Integrated Ferroelectrics*, Tempe, AZ, March 1997.

M. Azuma, T. Nasu, M. Kibe, Y. Uemoto, A. Inoue, Y. Shimada, E. Fujii, t. Otsuki, G. Kano, M. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Optimized C-axis Oriented Strontium Bismuth Tantalate Grown from Metal Organic Deposition (MOD) Solutions," abstract presented at *The Proceedings of the Eighth International Symposium on Integrated Ferroelectrics*, Tempe, AZ, March 1997.

C.A. Paz de Araujo, J. Cuchiaro, V. Joshi, A. DeVilbiss, ***L. D. McMillan***, and M. Azuma, "Characterization and Optimization of $A_{m-1}Bi_2(Ta_{1-x}Nb_x)_mO_{3m+3}$ Layered Perovskites using Rayleight's Analysis," abstract presented at *The Proceedings of the Eighth International Symposium on Integrated Ferroelectrics*, Tempe, AZ, March 1997.

S. Hayashi, Y. Oishi, Y. Shimada, T. Mikawa, T. Otsuki, ***L. D. McMillan***, G.F. Derbenwick, and C.A. Paz de Araujo, "Characterization of $SrBi_2Ta_2O_9$ Thin Film Capacitors on Pt/TiOx Electrodes by Misted Deposition Technique," abstract presented at *The Proceedings of the Eighth International Symposium on Integrated Ferroelectrics*, Tempe, AZ, March 1997.

K. Arita, Y. Shimada, Y. Uemoto, S. Hayashi, M. Azuma, Y. Judai, T. Sumi, E. Fujii, T. Otsuki, ***L.D. McMillan*** and C.A. Paz de Araujo, "Ferroelectric Nonvolatile Memory Technology With Bismuth Layer-Structured Ferroelectric Materials", Proceedings of the *10th IEEE International Symposium on Applications of Ferroelectrics*, Vol 1, Aug. 1996.

F.M. Ross, K.M. Krishnan, N. Thangaraj, R.F.C. Farrow, R.F. Marks, A. Cebollada, S.S.P. Parkin, M.J. Toney, M. Huffman, C.A. Paz de Araujo, ***L. D. McMillan***, J. Cuchiaro, M.C. Scott, C. Echer, F. Ponce, M.A. O'Keefe, and E.C. Nelson, "Applications of Electron Microscopy In Collaborative Industrial Research," from *MRS Bulletin*, Vol. 21, No. 5, pp. 17-23, May 1996.

N. Soyama, H. Uchida, K. Kageyama, K. Ogi, M.C. Scott, J.D. Cuchiaro, G.F. Derbenwick, ***L. D. McMillan***, and C.A. Paz de Araujo, "Preparation of Self-Patterned $SrBi_2Ta_2O_9$ Thin Films from Photo-Sensitive Solutions," *Materials Research Society Symposium Proceedings,* Vol. 433, San Francisco, CA, pp. 91-96, April 1996.

T. Ito, S. Hiraide, H. Yoshimore, H. Watanabe, T. Mihara, C.A. Paz de Araujo, M.C. Scott, and ***L. D. McMillan***, "Characteristics of Low Temperature Annealed $SrBi_2Ta_2O_9$," abstract presented at *The Proceedings of the Seventh International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, March 1995.

V. Joshi, J.D. Cuchiaro, ***L. D. McMillan***, and C.A. Paz de Araujo, "Stoichiometry Control of Spin-on $SrBi_2Ta_2O_9$ Ferroelectric Thin Films," abstract presented at *The Proceedings of the Seventh International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, March 1995.

S. Hayashi, M. Azuma, Y. Oishi, T. Otsuki, M. Huffman, ***L. D. McMillan***, and C.A. Paz de Araujo, "Preparation and Characterization of Y-1 Capacitors by Misted Deposition Technique," abstract presented at *The Proceedings of the Seventh International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, March 1995.

T. Mihara, H. Yoshimori, H. Watanabe, T. Itoh, C.A. Paz de Araujo, and ***L. D. McMillan***, "Superior Electrical Characteristics of Bi-layered Perovskite Thin Film and Comparison with PZT," abstract presented at *The Proceedings of the Seventh International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, March 1995.

Y. Oishi, M. Azuma, S. Hayashi, ***L. D. McMillan***, and C.A. Paz de Araujo, "Electrical Characteristics of Mn Doped Thin Film BST," abstract presented at *The Proceedings of the Seventh International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, March 1995.

T. Sumi, N. Moriwaki, G. Nakane, T. Nakakuma, Y. Judai, Y. Uemoto, Y. Nagano, S. Hayashi, M. Azuma, T. Otsuki, G. Kano, J.D. Cuchiaro, M.C. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "256Kb Ferroelectric Nonvolatile Memory Technology for 1T/1C Cell with 100ns Read/Write Time at 3V," *Integrated Ferroelectrics,* Part 1, Vol. 6, pp. 1-13, 1995.

J.F. Scott, D. Galt, J.C. Price, J.A. Beale, R.H. Ono, C.A. Paz de Araujo, and ***L. D. McMillan***, "A Model of Voltage-Dependent Dielectric Losses for Ferroelectric MMIC Devices," *Integrated Ferroelectrics,* Part 1, Vol. 6, pp. 189-203, 1995.

T. Otsuki, T. Sumi, E. Fujii, Y. Judai, Y. Shimada, N. Moriwaki, Y. Uemoto, M. Azuma, S. Hayashi, Y. Oishi, K. Arita, A. Inoue, T. Nagano, ***L. D. McMillan***, and C.A. Paz de Araujo, "Ferroelectric Thin Film and Integration Technology, *'95 MOCVD Workshop for Silicon Processing,* Kyungiu, Korea, pp. 224-226, 1995.

J.W. Gregory, J.D. Cuchiaro, C.A. Paz de Araujo, and ***L. D. McMillan***, "The Effect of Thin Film Scaling on the Capacitance versus Voltage Characteristic of a Ferroelectric Memory Cell," *Integrated Ferroelectrics,* Part 1, Vol. 6, pp. 281-288, 1995.

Y. Shimada, Y. Nagano, E. Fujii, M. Azuma, Y. Uemoto, T. Sumi, Y. Judai, S. Hayashi, N. Moriwaki, J. Nakane, T. Otsuki, C.A. Paz de Araujo, and ***L. D. McMillan***, "Integration Technology of Ferroelectrics and The Performance of the Integrated Ferroelectrics," *Proceedings of the Seventh International Symposium on Integrated Ferroeelctrics, Colo. Spgs., CO, Vol. 11, Part 11, pp. 229-245, September 1995.*

C.A. Paz de Araujo, J.D. Cuchiaro, ***L. D. McMillan***, M.C. Scott, and J.F. Scott, "Fatigue-Free Ferroelectric Capacitors with Platinum Electrodes," *Nature*, Vol. 374, pp. 627-629, April 1995.

L. D. McMillan, "Deposition of Barium Strontium Titanate and Strontium Titanate via Liquid Source Chemical Vapor Deposition", *Integrated Ferroelectrics*, Vol. 00, pp. 000-000, 1994.

J.F. Scott, C.A. Paz de Araujo, ***L.D. McMillan***, "Ferroelectric Thin Films and Thin Film Devices", *Ferroelectric Ceramics.*

C.A. Paz de Araujo, B.M. Melnick, ***L.D. McMillan***, "The Impact of Space Charge on the Measurement of the Dielectric Constant Using the C-V Method in Ferroelectric Memories", abstract.

M. Huffman and ***L. D. McMillan***, "Liquid Source Misted Chemical Deposition: Technoloy Status and Recent Results", presented at the *2[nd] Pacific Rim Conference on Ferroelectric Applications*, Melbourne, Australia, November, 1994.

L. D. McMillan, "Deposition of Barium Strontium Titanate and Strontium Titanate via Liquid Source Chemical Vapor Deposition", *Condensed Matter News*, Vol. 3, No. 4, 1994, p. IX, *Integrated Ferroelectrics*, Vol. 5, pp. 97-102, 1994.

T. Mihara, C.A. Paz de Araujo, J.D. Cuchiaro, H. Watanabe, and ***L.D. McMillan***, "Feasibiity for Memory Devices and Electrical Characterization of Newly Developed Fatigue Eliminated Ferroelectric Capacitors".

L. D. McMillan, M. Huffman, T.L. Roberts, M.C. Scott, and C.A. Paz de Araujo, "Deposition of $Ba_{1-x}Sr_xTiO_3$ and $SrTiO_3$ via Liquid Source CVD (LSCVD) for ULSI Drams," *Integrated Ferroelectrics*, Vol. 4, pp. 319-324, 1994.

J.F. Scott, M. Azuma, C.A. Paz de Araujo, ***L. D. McMillan***, M.C. Scott, and T. Roberts, "Dielectric Breakdown in High-ε Films for ULSI DRAM's: II. Barium-Strontium Titanate Ceramics," *Integrated Ferroelectrics*, Vol. 4, pp. 61-84, 1994.
D. Chen, M. Azuma, ***L. D. McMillan***, and C.A. Paz de Araujo, "A Simple Unified Analytic Model for Ferroelectric Thin Film Capacitor and Its Application for Nonvolatile Memory Operation," presented at *The Ninth International Symposium on the Applications of Ferroelectrics*, University Park, PA, August 1994.

B.M. Melnick, M.C. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Characterization of a Spin-On 70/30 BST Process," abstract presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

T. Ito, S. Hiraide, H. Yoshimori, H. Watanabe, T. Mihara, C.A. Paz de Araujo, M.C. Scott, and ***L. D. McMillan***, "Characteristics of Ultra Thin Y-1 for a 1V Non-volatile Memory," abstract presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

J.D. Cuchiaro, C.A. Paz de Araujo, B.M. Melnick, and ***L. D. McMillan***, "The Effects of Bipolar Pulsed Fatiguing on the CV Characteristics of PZT and Y-1 Discrete Capacitors," abstract presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

J.W. Gregory, C.A. Paz de Araujo, and ***L. D. McMillan***, "The Effect of Thin Scaling on the Capacitance Versus Voltage Characteristic of a Ferroelectric Memory Cell," abstract presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

M. Azuma, M. Huffman, S. Hayashi, M.C. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Device Characteristics of Fatigue Free Y1 Deposited by LSCVD," presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

C.A. Paz de Araujo, J.W. Gregory, M. Huffman, J.D. Cuchiaro, J. McNelis, ***L. D. McMillan***, and J.F. Scott, "Device Physics of Ferroelectric Storage Cells," invited talk presented at *The 2nd Pacific Rim Conference on Ferroelectric Applications*, Melbourne, Australia, November 1994.

M. Huffman, ***L. D. McMillan***, M.C. Scott, and C.A. Paz de Araujo, "Novel Liquid Source CVD Technique for Ferroelectric, High Dielectric Constant and Complex Oxide Thin Films," presented at *The 9th International Symposium on the Applications of Ferroelectrics*, University Park, PA, August 1994.

S. Hayashi, M. Huffman, M. Azuma, Y. Shimada, T. Otsuki, G. Kano, ***L. D. McMillan***, and C.A. Paz de Araujo, "Gigabit-Scale DRAM Capacitor Technology with High Dielectric Constant Thin Films by a Novel Conformal Deposition Technique," *Symposium on VLSI Technology*, Honolulu, Hawaii, June 1994.

K. Arita, E. Fujii, Y. Shimada, Y. Uemoto, M. Azuma, S. Hayashi, T. Nasu, A. Inoue, A. Matsuda, Y. Nagano, S. Ktasu, T. Otsuki, G. Kano, ***L. D. McMillan***, and C.A. Paz de Araujo, "Application of Ferroelectric Thin Films to Si Devices," *The Institute of Electronics, Information and Communication Engineers*, E77-C, No. 3, March 1994.

M. Huffman, ***L. D. McMillan*** and C.A. Paz de Araujo, "Ferroelectric Integration: Progress and Challenges," *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

S. Hayashi, M. Huffman, M. Azuma, ***L. D. McMillan***, C.A. Paz de Araujo, Y. Shimada, and T. Otsuki, "Growth and Electrical Properties of $Ba_{0.7}Sr_{0.3}TiO_3$ Thin Films by LSCVD on 6 Inch Wafers," abstract presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

T. Sumi, N. Moriwaki, G. Nakane, T. Nakakuma, Y. Judai, Y. Uemoto, Y. Nagano, S. Hayashi, M. Azuma, T. Otsuki, G. Kano, J.D. Chchiaro, M.C. Scott, ***L. D. McMillan*** and C.A. Paz De Araujo, ""56Kb Ferroelectric Nonvolatile Memory Technology For lt/IC Cell With 100ns Read/Write Time At 3V"," abstract presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

J.F. Scott, D. Galt,. J.C. Price, J.A. Beall, R.H. Ono, C.A. Paz De Araujo and ***L. D. McMillan***, "A Model Of Voltage-Dependent Dielectric Losses For Ferroelectric MMIC Devices", abstract presented at *The 6th International Symposium on Integrated Ferroelectrics*, Monterey, CA, March 1994.

M. Huffman, C.A. Paz de Araujo, ***L. D. McMillan***, J.D. Cuchiaro, M.C. Scott, and C. Echer, "Layered Perovskites and Their Applications in Ferroelectric Memories: Microstructural Compositional and Electrical Characterization of Y1-type Ferroelectric Films," presented at *The 1994 Fall Meeting of Materials Research Society*, Boston, MA, November 1994.

S. Hayashi, M. Azuma, Y. Yumoto, Y. Shimada, T. Otsuki, M. Huffman, M.C. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Preparation and Characterization of Ferroelectric Thin Films by LSMCVD," presented at *The 1994 Fall Meeting of Materials Research Society*, Boston, MA, November, 1994.

S. Hayashi, Y. Uemoto, Y. Shimada, M. Azuma, T. Otsuki, M. Huffman, ***L. D. McMillan***, and C.A. Paz de Araujo, "Preparation and Characterization of Ferroelectric Thin Films by LSMCVD," presented at the *Japan Society of Applied Physics Fall Meeting*, Nagoya, Japan, September 1994.

B.M. Melnick, M.C. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Anomalous Fatigue Behavior in Zn Doped PST," *Condensed Matter News*, Vol. 3, No. 1, pp. XI-XII, 1994.

J.F. Scott, B.M. Melnick, J.D. Cuchiaro, R. Zuleeg, C.A. Paz de Araujo, ***L. D. McMillan***, and M.C. Scott, "Negative Differential Resistivity in Ferroelectric Thin-Film Current-Voltage Relationships," *Integrated Ferroelectrics*, Vol. 4, pp. 85-92, 1994.

J.F. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "High-Dielectric Films for ULSI DRAMs and Non-Volatile FETs," presented at *The 3rd Asean Regional Seminar on Microelectronics and Information Technology*, Bangkok, Thailand, August 1994.

D-Y Chen, J.W. Gregory, T.S. Kalkur, C.A. Paz de Araujo, ***L. D. McMillan***, and T.A. Rabson, "Modeling of Metal-Ferroelectric-Semiconductor Field Effect Transistor Subthreshold Current," *Integrated Ferroelectrics*, Vol. 5, pp. 265-274, 1994.

L.D. McMillan, "Deposition of Barium Strontium Titanate and StrontiumTtitanate via Liquid Source Chemical Vapor Deposition", abstract, *The First International Workshop on the Application of Ferroelectric Materials, Korea Advanced Institute of Science and Technology*, Taejon, Korea, p. 91, October 21, 1993.

J.F. Scott, B.M. Melnick, ***L. D. McMillan***, C.A. Paz de Araujo, and M. Azuma, "Dieletric Breakdown in High-Films for ULSI DRAMs," *Integrated Ferroelectrics,* Vol. 150, pp. 209-218, 1993.

J.F. Scott, B.M. Melnick, ***L. D. McMillan*** and C.A. Paz de Araujo, "Dielectric Breakdown in High-ε Films For ULSI Drams, *Integrated Ferroelectric,* 1993, Vol. 3. pp. 225-243.

B.M. Melnick, M.C. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Anomalous Fatigue Behavior in Zn Doped PZT," *Integrated Ferroelectrics,* Vol. 3, pp. 293-300, 1993.

T. Mihara, H. Yoshimori, S. Hiraide, H. Watanabe, Y. Kuroda, T. Takahashi, H. Nakano, C.A. Paz de Araujo, ***L. D. McMillan***, and Y. Ishibashi, "Studies of Integrated Ferroelectric Thin Film Capacitors for Nonvolatile Memory Application," presented at *The 5th International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, April 1993. Also, peer reviewed and published in *The Journal of Integrated Ferroelectrics.*

T. Mihara, H. Watanabe, H. Nakano, S. Hiraide, C.A. Paz de Araujo, and ***L. D. McMillan***, "Process Integration for Y1 Capacitors with CMOS Devices," presented at *The 5th International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, April 1993. Also, peer reviewed and published in *The Journal of Integrated Ferroelectrics.*

C.A. Paz de Araujo and ***L. D. McMillan***, "A New Material for Non-Volatile Memory, Which can Rewrite more than 10^{12} Times, was Developed and Measured," *Nikkei Electronics,* pp. 94-100, May 1993. (Japanese text)

M. Azuma, E. Fujii, Y. Uemoto, S. Hayashi, T. Hasu, Y. Shimada, A. Matsuda, M. Kibe, T. Otsuki, G. Kano, M.C. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "ULSI DRAM Technology with High Dielectric Constant Materials," presented at *The 5th International Symposium on Integrated Ferroelectrics,* Colo. Spgs., CO, April 1993. Also, peer reviewed and published in *The Journal of Integrated Ferroelectrics.*

J.F. Scott, M. Azuma, C.A. Paz de Araujo, ***L.D. McMillan***, M.C. Scott, and T. Roberts, "Dielectric Breadkdown in High-ε Films for ULSI DRAMS: II Barium-Strontium Titanate Ceramics", *Matsushita Electronics Corporation 1993 Annual Report.*

J.F. Scott, M. Azuma, C.A. Paz de Araujo, ***L. D. McMillan***, M.C. Scott, and T. Roberts, "Dielectric Breakdown in High-ε Films for ULSI DRAMS: II. Barium-Strontium Titanate Ceramics," *ISIF*, Monterey, CA, 1993.

J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Ferroelectric Thin Films and Thin Film Devices," invited paper, presented at *Summer School of Ferroelectric Thin Films and Memories,* Lacarns, Switzerland, Sept. 1991 AND *Ferroelectric Ceramics,* book chapter, pp. 185-211, 1993.

L. D. McMillan, C.A. Paz de Araujo, T. Roberts, J.D. Cuchiaro, M.C. Scott, and J.F. Scott, "Liquid Source CVD," *Integrated Ferroelectrics,* Vol. 2, pp. 351-359, 1992.

C.A. Paz de Araujo, R. Zuleeg, T. Mihara, H. Watanabe, A. Carrico, ***L. D. McMillan***, and J.F. Scott, "Statistical Theory of Fatigue in Ferroelectric Devices," *Integrated Ferroelectrics*, Vol. 1, pp. 305-322, 1992.

C.A. Paz de Araujo, ***L. D. McMillan***, and J.F. Scott, "Processing of Ferroelectric Memories," *Materials Resource Society Symposium Proceedings*, Vol. 2, pp. 351-359, 1992.

E. Fujii, Y. Uemoto, S. Hayashi, T. Nasu, Y. Shimada, A. Matsude, M. Kibe, M. Azuma, T. Otsuki, G. Kano, M. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "ULSI DRAM Technology with $Ba_{0.7}Sr_{0.3}TiO_3$ Film of 1.3nm Equivalent SiO_2 Thickness and 10^{-9} A/cm^2 Leakage Current," presented at *International Electron Devices Meeting*, San Francisco, CA, December 1992.

J.F. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "High-e Films as SiO_2 Replacements in ULSI Devices," invited paper, *IEEE Specialists' Conference on Semiconductor Interfaces*, San Diego, CA, December 1992.

J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Anomalous Switching Kinetics in Ferroelectric Thin (≤ 200nm) Films," presented at *International Conference on Domains*, Nantes, France, 1992. (*Ferroelectrics*, Vol. 140, pp. 219-223, 1993).

J.F. Scott, M. Azuma, E. Fujii, T. Otsuki, G. Kano, M. C. Scott, C.A. Paz de Araujo, ***L. D. McMillan***, and T. Roberts, "Microstructure-Induced Schottky Barrier Effects in Barium Strontium Titanate (BST) Thin Films for 16 and 64 mbit DRAM Cells," presented at *International Symposium on Applications of Ferroelectrics*, South Carolina, August 1992.

J.F. Scott, C.A. Paz de Araujo, ***L. D. McMillan***, H. Yoshimori, H. Watanabe, T. Mihara, M. Azuma, T. Ueda, D. Ueda, and G. Kano, "Ferroelectric Thin Films in Integrated Microelectronics Devices," presented at *The 25th International Conference on Polar Dielectrics*, London, April 1992. (*Ferroelectrics*, Vol. 133, pp. 47-60, 1992).

B.M. Melnick, ***L. D. McMillan***, and C.A. Paz de Araujo, "The Effect of "Excess Pb- Based Layered Capacitor Structures" on the Fatigue Characteristics of Ferroelectric Memories", April 1992.

J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Integrated Ferroelectrics," presented at *TMS Electronic and Photonic Device Materials Conference*, San Diego, CA, March 1992.

B.M. Melnick, J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Thickness Dependence of d.c. Leakage Current in Lead Zirconate-Titanate (PZT) Memories," *Ferroelectrics*, Vol. 135, pp. 163-168, 1992.

T. Mihara, H. Watanabe, H. Yoshimori, C.A. Paz de Araujo, B.M. Melnick, and ***L. D. McMillan***, "Process Dependent Electrical Characteristics and Equivalent Circuit Model of Sol-Gel Based PZT Capacitors," *Integrated Ferroelectrics*, Vol. 1, pp. 269-291, 1992.

J.F. Scott, B.M. Melnick, C.A. Paz de Araujo, ***L. D. McMillan***, and R. Zuleeg, "d.c. Leakage Currents in Ferroelectric Memories," *Integrated Ferroelectrics*, Vol. 1, pp. 323-331, 1992.

J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Integrated Ferroelectrics," *Condensed Matter News*, Vol. 1, No. 3, pp. 16-20, 1992.

B.M. Melnick, M.C. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Anomalous Fatigue Behavior in Zn Doped PZT," *The Proceedings of the Fourth International Conference on Integrated Ferroelectrics*, Monterey, CA, p. 221, March 1992.

H. Yoshimori, H. Nakano, T. Mihara, H. Watanabe, C.A. Paz de Araujo, and ***L. D. McMillan***, "A Low Density Ferroelectric RAM," *The Proceedings of the Fourth International Conference on Integrated Ferroelectrics*, Monterey, CA, p. 275, March 1992.

T. Mihara, H. Watanabe, C.A. Paz de Araujo, J.D. Cuchiaro, M. Scott, and ***L. D. McMillan***, "Feasibility for Memory Devices and Electrical Characterization of Newly Developed Fatigue Free Capacitors," *The Proceedings of the Fourth International conference on Integrated Ferroelectrics*, Monterey, CA, p. 173, March 1992.

J.D. Cuchiaro, M.C. Scott, C.A. Paz de Araujo, T. Mihara, and ***L. D. McMillan***, "Switching Kinetics of Ferroelectric Fatigue Free Material," presented at *The Fourth International Conference on Integrated Ferroelectrics*, Monterey, CA, March 1992.

L. D. McMillan, J.F. Scott, C.A. Paz de Araujo, "Liquid-Source CVD of Ferroelectric Thin-Film Memories," invited paper, *39th National Symposium, American Vacuum Society*, November 1992.

J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Ferroelectric Thin Films and Thin Film Devices," *Ferroelectric Ceramics*, Springer-Verlag (London) 1992.

A.K. Kulkarni, G. Rohrer, S. Narayan, and ***L.D. McMillan***, "A Circuit Model for a Thin Film Ferroelectric Memory Device", *Ferroelectrics*, Vol. 116 \, pp. 95-106, 1991.

J.F. Scott, C.A. Paz de Araujo, B.M. Melnick, ***L.D. McMillan*** and R. Zuleeg, "Quantitative Measurement of Space-Charge Effects in Lead Zirconate-Titanate Memories", *Journal of Applied Physics*, Vol. 70, No. 1, pp. 382-388, 1 July 1991.

L.D. McMillan, C.A. Paz de Araujo, M. Scott, "High Dielectric Constant Materials and Processes For Advanced Multi-Layered PC Boards", *study conducted for Storage Technology Corp.*, 1991.

B.M. Melnick, C.A. Paz de Araujo, ***L. D. McMillan***, D.A. Carver, and J.F. Scott, "Recent Results on Switching, Fatigue and Electrical Characterization of Sol-Gel Based PZT Capacitors," *Ferroelectrics*, Vol. 116, pp. 79-93, 1991.

J.F. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Ferroelectric Memories: A Comparison with Other High-Speed Digital Devices," *Ferroelectrics*, Vol. 116, pp. 147-155, 1991.

J.F. Scott, C.A. Paz de Araujo, B.M. Melnick, ***L. D. McMillan***, and R. Zuleeg, "Quantitative Measurement of Space-Charge Effects in Lead Zirconate-Titanate Memories," *Journal of Applied Physics*, Vol. 69, No. 11, June 1991.

J.F. Scott, C.A. Paz de Araujo, B.M. Melnick, and ***L. D. McMillan***, "Physics and Engineering of Ferroelectric Memories," presented at *The Fifth U.S.-Japan Seminar on Dielectric and Piezoelectric Ceramics*, Kyoto, Japan, December 1990.

J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Ferroelectric Ceramic Memories," presented at *The International Conference on Electronic Ceramics-Production and Properties*, Riga, Latvia, April 1990.

B.M. Melnick, J.D. Cuchiaro, ***L. D. McMillan***, C.A. Paz de Araujo, and J.F. Scott, "Process Optimization and Characterization of Device Worthy Sol-Gel Based PZT for Ferroelectric Memories," *Ferroelectrics*, Vol. 112, pp. 329-351, 1990.

C.A. Paz de Araujo, ***L. D. McMillan***, B.M. McMillan, J.D. Cuchiaro, and J.F. Scott, "Ferroelectric Memories," *Ferroelectrics*, Vol. 104, pp. 241-256, 1990.

H.M. Duiker, P.D. Beale, J.F. Scott, C.A. Paz de Araujo, B.M. Melnick, J.D. Cuchiaro, and ***L. D. McMillan***, "Fatigue and Switching in Ferroelectric Memories: Theory and Experiment," *Journal of Applied Physics*, Vol. 68, No. 11, pp. 5783-5791, December 1990.

J.F. Scott, C.A. Paz de Araujo, B.M. Melnick, and ***L. D. McMillan***, "Physics and Engineering of Ferroelectric Memories," presented at *The Fifth U.S.-Japan Seminar on Dielectric and Piezoelectric Ceramics*, Kyoto, Japan, December 1990.

J.F. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Switching Kinetics of Lead Zirconate Titanate Sub-Micron Thin-Film Memories," *Ferroelectrics*, Vol. 93, pp. 31-36, 1989.

J.F. Scott, C.A. Paz de Araujo, and ***L. D. McMillan***, "Ferroelectric Memory Applications," invited paper, presented at *The IEEE 1989 Ultrasonic Symposium & Short Courses*, Montreal, Canada, pp. 299-308, October 1989.

J.F. Scott, C.A. Paz de Araujo, H.B. Meadows, ***L. D. McMillan***, and A. Shawabkeh, "Radiation Effects on Ferroelectric Thin-Film Memories: Retention Failure Mechanisms," *Journal of Applied Physics*, Vol. 66, No. 3, pp. 1444-1453, August 1989.

A.K. Kulkarni, G. Rohrer, ***L.D. McMillan***, and Adams, "Dependence Of The Electrical Properties Of KNO_3 Memory Devices On Fabrication And Processing Parameters", *The 35th National Symposium Of The American Vacuum Society*, Atlanta, GA, October, 1988.

A.K. Kulkarni, G. Rohrer, ***L.D. McMillan***, and Adams, "Structural Properties Of Thin Film Memory Devices", 15th International Conference on Metallurgical Coatings, San Diego, CA, April, 1988.

J.F. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Switching Kinetics of Lead Zirconate Titanate Sub-Micron Thin-Film Memories," *Ferroelectrics*, September 1988.

L.D. McMillan, "Ferroelectric Material Developments", Department of Defense Advisory Group On Electron Devices, Boulder, CO, 23 June, 1988.

G. Rohrer, S. Narayan, ***L.D. McMillan***, and A.K. Kulkarni, "A New Technique For Characterization Of Thin-Film Ferroelectric Memory Devices", Journal of Vacuum Science Technology, A 6(3), May/June 1988.

L.D. McMillan, "Ferroelectric Materials And Deposition Techniques", Joint Industry And Government Conference On Ferroelectrics, Colorado Springs, CO, September, 1988.

J.F. Scott, ***L. D. McMillan***, and C.A. Paz de Araujo, "Switching Kinetics of Lead Zirconate Titanate Sub-Micron Thin-Film Memories," presented at *The First European Conference on Applications of Polar Dielectrics, International Symposium on Applications of Ferroelectrics*, Zurich, Switzerland, August 1988.

L.D. McMillan, "New Space Age Electronic Materials", *Seminar on Electronic Materials*, Michigan Technological University, Houghton, MI, 24 August, 1988.

J.F. Scott, M. Zhang, R.B. Godfrey, C.A. Paz de Araujo, and ***L. D. McMillan***, "Raman Spectroscopy of Submicron KNO_3 Films" *Physical Review B-Condensed Matter, The American Physical Society*, Vol. 35, No. 8, pp. 4044-4051, March 1987.

A.K. Kulkarni, S. Narayan, G. Rohrer, and ***L.D. McMillan***, "Electrical Properties OF KNO_3 Thin Film Memory Devices", *International Conference On Thin Films*, New Deli, India, 7 December 1987.

S. Narayan, A.K. Kulkarni, G. Rohrer, and ***L.D. McMillan***, "A New Technique For Characterizing Thin Film Ferroelectric Memory Devices", *34th National Symposium of the American Vacuum Society*, Anaheim, California, 2 November 1987.

J.F. Scott, R.B. Godfrey, C.A. Paz de Araujo, ***L. D. McMillan***, H.B. Meadows, and M. Golabi, "Device Characteristics of Ferroelectric Ceramic KNO_3 Thin-Film Raw Memories," *Proceedings of the Sixth IEEE International Symposium on Applications of Ferroelectrics*, Lehigh University, Bethlehem, PA, June 1986.

C.A. Paz de Araujo, J.F. Scott, R.B. Godfrey, and ***L. D. McMillan***, "Analysis of Switching Transients in KNO_3 Ferroelectric Memories," *Applied Physics Letter*, Vol. 48, No. 21, May 1986.

R.B. Godfrey, J.F. Scott, H.B. Meadows, M. Golabi, C.A. Paz de Araujo, and ***L. D. McMillan***, "Analysis of Electrical Switching in Sub-Micron KNO_3 Thin-Films," *Ferroelectrics Letters*, Vol. 5, pp. 167-172, 1986.

L. D. McMillan, "Rampac Development Program Status Review", *International Technology Symposium*, Sydney, Australia, 28 October 1985.

L. D. McMillan, *"A New Ferroelectric Non-Volatile Memory", U. S. Government Non-Volatile Memory Technology Review Conference, Baltimore, MD, 29 August 1985.*

R.B. Godfrey, C.A. Paz de Araujo, G. Rohrer, and ***L. D. McMillan***, "High Speed (<100ns) Non-Volatile Memory using Ferroelectric Switching," *Fourth Australian Microelectronics Conference,* Sydney, Australia, May 1985.

L. D. McMillan, "Cubic Integration", Ramtron Technical Disclosure Level 2, File No. 6, Document No. 018, (1985).

C.A. Paz de Araujo, ***L. D. McMillan***, and G. Rohrer, "Development of Advanced Non-Volatile Thin Film Ferroelectric Memories," *UCCS proposal*, funded, April 1984.

L. D. McMillan and F. Stephenson, "Computer Model Analysis of Process Wafer Requirements and Associated Costs", *Microelectronics Measurement Technology Seminar*, San Jose, CA (18 March, 1981).

L. D. McMillan, "Semiconductor Process Newsletters", *Stephenson Western, Inc.*, (Published Monthly, 1980-1982).

L. D. McMillan, "MOS C-V Techniques for IC Process Control", *Solid State Technology*, pp 605-610, September 1972.

Patents (Issued and Pending)

PATENT # COUNTRY	DATE OF ISSUE	PATENT TITLE
45985 Singapore	03/30/99	Integrated Circuits Having Mixed Layered Superlattice Materials and Precursor Solutions For Use In A Process of Making The Same
53405 Singapore	09/21/99	Methods and Apparatus for Material Deposition Using Primer
56664 Singapore	11/16/99	Misted Precursor Deposition Apparatus and Method with Improved Mist Flow
56717 Singapore	03/14/97	Method and Apparatus for Fabricating Silicon Dioxide and Silicon Glass Layers in Integrated Circuits
DE 692 31 865 T 2 Germany	09/20/01	Layered Superlattice Material Applications
E201938 Austria	07/25/01	Layered Superlattice Material Applications
EP 0 616 723 Europe	06/20/01	Process For Fabricating Layered Superlattice Materials
EP 0 616 726 Europe	07/03/01	Layered Superlattice Material Applications
EP 0 665 814 Europe	01/15/97	Precursors and Processes for Making Metal Oxides
EP 0 665 981 Europe	03/20/02	Process For Fabricating Layered Superlattice Materials And Making Electronic Devices Including Same
EP 0 975 556 Europe	11/07/001	Method Of Forming Magnesium Oxide Films On Glass Substrate For Use In Plasma Display Panels
FR 0 616 726 France	06/06/01	Layered Superlattice Material Applications
NI 102545 Taiwan	08/19/99	Method and Apparatus for Fabricating Silicon Dioxide and Silicon Glass Layers in Integrated Circuits
NI 106205 Taiwan	12/30/99	Liquid Source Formation of Thin films Using Hexamethyl-Disilazane
NI 116293 Taiwan	01/10/01	Low Imprint Ferroelectric Material for Long Retention Memory and Method of Making the Same
NI 126 893 Taiwan	06/04/01	Misted Precursor Deposition Apparatus And Method With Improved Mist And Mist Flow
NI 130298 Taiwan	08/09/01	Ferroelectric Flat Panel Displays
NI 132591	09/13/01	Method Of Liquid Deposition By Selection Of Liquid Viscosity And

Taiwan		Other Precursor Properties
202,532 South Korea	03/29/99	Methods of Apparatus for Materials Deposition
234,621 South Korea	09/17/99	Precursors and Processes for Making Metal Oxides
269,025 South Korea	07/18/00	Process For Fabricating Layered Superlattice Materials
295,698 South Korea	05/02/01	Integrated Circuits Having Mixed Layered Superlattice Materials and Precursor Solutions For Use In A Process of Making The Same
2 860 505 Japan	12/11/98	Apparatus for Depositing Materials
3 113 281 Japan	09/22/00	Precursors and Processes for Making Metal Oxides
3 162 717 Japan	02/23/01	Process For Fabricating Layered Superlattice Materials
3 162 718 Japan	02/23/01	Layered Superlattice Material Applications
3 238 663 Japan	10/05/01	Methods And Apparatus For Material Deposition
3 439 222 Japan	06/13/03	Low Imprint Ferroelectric Material For Long Retention Memory And Method Of Making Same
3,986,897 USA	10/19/76	Aluminum Treatment to Prevent Hillocking.
4,279,947 USA	07/21/81	Deposition of Silicon Nitride
4,707,897 USA	11/24/87	Monolithic Semiconductor Integrated Circuit Ferroelectric Memory Device, And Methods of Fabricating And Utilizing Same.
4,713,157 USA	12/15/87	Combined Integrated Circuit/Ferroelectric Memory Device, and Ion Beam Methods of Constructing Same.
5,024,964 USA	06/18/91	Method of Making Ferroelectric Memory Devices
5,119,760 USA	06/09/92	Methods and Apparatus for Material Deposition
5,138,520 USA	08/11/92	Methods and Apparatus for Material Deposition

5,214,300 USA	05/25/93	Monolithic Semiconductor Integrated Circuit Ferroelectric Memory Device.
5,316,579 USA	05/31/94	Apparatus for Forming a Thin Film with Mist Forming Means
5,406,510 USA	04/11/95	Non-Volatile Memory
5,423,285 USA	06/13/95	Process for Fabricating Materials for Ferroelectric High Dielectric Constant and Integrated Circuit Applications
5,434,102 USA	07/18/95	Process for Fabricating Layered Superlattice Materials and Making Electronic Devices Including Same
5,439,845 USA	08/08/95	Process for Fabricating Layered Superlattice Materials and Making Electronic Devices Including Same
5,444,290 USA	08/22/95	Method and Apparatus for Programming Anti-Fuse Elements Using Combined AC and DC Electric Fields
5,456,945 USA	10/10/95	Method and Apparatus for Materials Deposition
5,463,244 USA	10/31/95	Antifuse Programmable Element Using Ferroelectric Material
5,466,629 USA	11/14/95	Process for Fabricating Ferroelectric Integrated Circuit
5,468,679 USA	11/21/95	Process for Fabricating Materials for Ferroelectric High Dielectric Constant and Integrated Circuit Applications
5,468,684 USA	11/21/95	Integrated Circuit with Layered Superlattice Material and Method of Fabricating Same
5,487,032 USA	01/23/96	Method and Apparatus for Reduced Fatigue in Ferroelectric Memory Elements
5,508,954 USA	04/16/96	Method and Apparatus for Reduced Fatigue in Ferroelectric Memory
5,514,822 USA	05/07/96	Precursors and Processes for Making Metal Oxides
5,519,234 USA	05/21/96	Ferroelectric Dielectric Memory Cell Can Switch at Least Giga Cycles and has Low Fatigue - Has High Dielectric Constant and Low Leakage Current
5,523,964 USA	06/04/96	Ferroelectric Non-Volatile Memory Unit
5,540,772 USA	07/30/96	Misted Deposition Apparatus For Fabricating an Integrated Circuit

USA		
5,541,870 USA	07/30/96	Ferroelectric Memory and Non-Volatile Memory Cell for Same
5,559,260 USA	09/24/96	Precursors and Processes for Making Metal Oxides
5,559,733 USA	09/24/96	Memory with Ferroelectric Capacitor Connectable to Transistor Gate
5,561,307 USA	10/01/96	Ferroelectric Integrated Circuit
5,612,082 USA	03/18/96	Process For Making Metal Oxides
5,614,252 USA	03/25/97	Method of Fabricating Barium Strontium Titanate
5,654,456 USA	08/05/97	Precursors and Processes for Making Metal Oxides
5,688,565 USA	11/18/97	Misted Deposition Method of Fabricating Layered Superlattice Materials
5,699,035 USA	12/16/97	ZNO Thin Film Varistors and Method of Making the Same
5,719,416 USA	02/17/98	Integrated Circuit with Layered Superlattice Material Compound
5,723,171 USA	03/03/98	Integrated Circuit Electrode Structure and Process for Fabricating Same
5,759,923 USA	06/02/98	Method and Apparatus for Fabricating Silicon Dioxide and Silicon Glass Layers in Integrated Circuits
5,784,310 USA	07/21/98	Low Inprint Ferroelectric Material for Long Retention Memory and Method of Making the Same
5,788,757 USA	08/04/98	Composition and Process Using Ester Solvents for Fabricating Metal Oxide Films and Electronic Devices Including the Same
5,792,592 USA	08/11/98	Photosensitive Liquid Precursor Solutions and Use Thereof in Making Thin Films
5,803,961 USA	09/08/98	Integrated Circuits having Mixed Layered Superlattice Materials and Precursor Solutions for Use in a Process of Making the Same
5,811,847 USA	09/22/98	PSZT for Integrated Circuit Applications
5,825,057	10/20/98	Process for Fabricating Layered Superlattice Materials and Making

USA		Electronic Devices Including Same
5,840,110 USA	11/24/98	Integrated Circuits having Mixed Layered Superlattice Materials and Precursor Solutions for Use in a Process of Making Same
5,843,516 USA	12/01/98	Liquid Source Formation of Thin films Using Hexamethyl-Disilazane
5,846,597 USA	12/08/98	Liquid Source Formation of Thin films Using Hexamethyl-Disilazane
5,849,071 USA	12/15/98	Liquid Source Formation of Thin films Using Hexamethyl-Disilazane
5,871,853 USA	02/16/99	UV Radiation Process for Making Electronic Devices Having Low-Leakage-Current and Low-Polarization Fatigue
5,883,828 USA	03/16/99	Low Imprint Ferroelectric Material for Long Retention Memory and Method of Making the Same
5,888,583 USA	03/30/99	Misted Deposition Method of Fabricating Integrated Circuits
5,909,042 USA	06/01/99	Electrical Component Having Low-Leakage Current and Low Polarization Fatigue Made by UV Radiation Process
5,932,295 USA	08/03/99	Method and Apparatus for Misted Liquid Source Deposition of Thin Films with Increased Yield
5,942,376 USA	08/24/99	Shelf-Stable Liquid Metal Aryketone Alcoholate Solutions and Use Thereof in Photo Initiated Patterning of Thin Films
5,943,111 USA	08/24/99	Layered Superlattice Ferroelectric Liquid Crystal Display
5,955,754 USA	09/21/99	Integrated Circuits Having Mixed Layered Superlattice Materials and Precursor Solutions for Use in a Process of Making Same
5,962,085 USA	10/05/99	Misted Precursors Deposition Apparatus and Method with Improved Mist and Mist Flow
5,965,219 USA	10/12/99	Misted Deposition Method with Applied UV Radiation
5,966,318 USA	10/12/99	Nondestructive Readout Memory Utilizing Ferroelectric Capacitors Isolated From Bitlines by Buffer Amplifiers
5,972,428 USA	10/26/99	Methods and Apparatus for Material Deposition Using Primer
5,997,642 USA	12/07/99	Method and Apparatus For Misted Deposition of Integrated Circuit Quality Thin Films
6,017,579 USA	01/25/00	Method of Forming Magnesium Oxide Films on Glass Substrate for Use in Plasma Display Panels
6,022,669 USA	02/08/00	Method of Fabricating an Integrated Circuit Using Self-Patterned Thin Films
6,051,858	04/18/00	Ferroelectric/High Dielectric Constant Integrated Circuit and Method

USA		of Fabricating Same.
6,056,994 USA	05/02/00	Liquid Deposition Methods of Fabricating Layered Superlattice
6,072,207	06/06/00	Process For Fabricating Layered Superlattice Materials And Making Electronic Devices Including Same
6,080,592 USA	06/27/00	Method of Making Layered Superlattice Materials for Ferroelectric, High Dielectric Constant, Integrated Circuit Applications
6,104,049 USA	08/15/00	Ferroelectric Memory With Ferroelectric Thin Film Having Thickness of 90 Nanometers or Less, and Method of Making Same
6,110,531 USA	08/29/00	Method and Apparatus for Preparing Integrated Circuit Thin Films by Chemical Vapor Deposition
6,116,184 USA	09/12/00	Method and Apparatus for Misted Liquid Source Deposition of Thin Film with Reduced Mist Particle Size
6,133,050 USA	10/17/00	UV Radiation Process for Making Electronic Devices Having Low-Leakage-Current and Low-Polarization Fatigue
6,143,063 USA	11/07/00	Misted Precursor Deposition Apparatus and Method with Improved Mist Flow
6,174,213 USA	01/16/01	Fluorescent Lamp and Method of Manufacturing Same
6,198,225 USA	03/06/01	Ferroelectric Flat Panel Displays
6,203,619 USA	03/20/01	Multiple Station Apparatus for Liquid Source Fabrication of Thin Films
6,258,733 USA	07/10/01	Method and Apparatus for Misted Liquid Source Deposition of Thin Film with Reduced Mist Particle Size
6,339,238 USA	01/15/02	Ferroelectric Field Effect Transistor, Memory Utilizing Same, And Memory of Operating Same
6,365,927 USA	04\02/02	Ferroelectric Integrated Circuit Having Hydrogen Barrier Layer
6,370,056 USA	04/09/02	Ferroelectric Memory And Method Of Operating Same
6,373,743 USA	04/16/02	Ferroelectric Memory And Method Of Operating Same
6,376,691 USA	04/23/02	Metal Organic Precursors For Transparent Metal Oxide Thin Films And Method Of Making Same
6,383,555 USA	05/07/02	Misted Precursor Deposition Apparatus And Method With Improved Mist And Mist Flow

6,404,003 USA	06/11/02	Thin Film Capacitors On Silicon Germanium Substrate
6,413,883 USA	07/02/02	Method Of Liquid Deposition By Selection Of Liquid Viscosity And Other Precursor Properties
6,437,380 USA	08/20/02	Ferroelectric Device With Bismuth Tantalate Capping Layer And Method Of Making Same
6,441,414 USA	08/27/02	Ferroelectric Field Effect Transistor, Memory Utilizing Same, And Memory Of Operating Same
6,448,190 USA	09/10/02	Method And Apparatus For Fabrication Of Integrated Circuit By Selective Deposition Of Precursor Liquid
6,511,718 USA	01/28/03	Method And Apparatus For Fabrication Of Thin Films By Chemical Vapor Deposition
6,537,830 USA	03/25/03	Method Of Making Ferroelectric FET With Polycrystalline Crystallographically Oriented Ferroelectric Material
6,559,469 USA	05/06/03	Ferroelectric And High Dielectric Constant Transistors
6,582,972 USA	06/24/03	Low Temperature Oxidizing Method Of Making A Layered Superlattice Material
98909128.5-2111	03/12/98	Method of Forming Magnesium Oxide Films on Glass Substrate for Use in Plasma Display Panels